V300 SET UP INSTRUCTIONS

FOR ADDITIONAL REFERENCES SEE H431 AND Q431

ISO 9001

SAFETY INSTRUCTIONS

Before using any Fluid Metering, Inc. product read the following safety instructions as well as specific product specifications and operating instructions.

Warning! Fire, electrical shock or explosion may occur if used near combustibles explosive atmosphere, corrosive air, wet environment or submerged in fluid.

- Turn off the electrical power before checking pump for any problems.
- Connect motor, speed controllers, or any other electrical devices based on Fluid Metering Inc. specifications. Any unauthorized work performed on the product by the purchaser or by third parties can impair product functionality and thereby relieves Fluid Metering, Inc. of all warranty claims or liability for any misuse that will cause damage to product and/or injury to the individual.
- Power cables and leads should not be bent, pulled or inserted by excessive force. Otherwise there is a threat of electrical shock or fire.
- Replace any inline fuses only with fuse rating as specified by Fluid Metering, Inc.
- When pump/drive is under operation, never point discharge tubing into face or touch any rotating components of pump. In a power down thermal overload cut-in condition, unplug or turn off power to pump. Always allow a cool down period before restarting: otherwise, injury or damage may occur.
- For 30 seconds after power is removed from pump/drive: do not touch any output terminals. Electrical shock may occur because of residual voltage.

Caution! Fire, electrical shock, injury and damage may occur if not used in accordance with Fluid Metering, Inc. specifications and operation instructions.

- Do not put wet fingers into power outlet of unit.
- Do not operate with wet hands.
- Do not operate drive assemblies that require a hard mount (to be bolted down) unless they are mounted per Fluid Metering. specifications, if not injury may occur and/or damage to unit.
- Do not touch any rotating pump or motor components: injury may occur.
- Do not run pump dry, unless designed for that service. Running dry is harmful to the pump, and will cause excessive heating due to internal friction.
- Check pump rotation and inlet/outlet pump port orientation before connecting power to pump. If not injury may occur.
- When pulling out cords from outlets do not pull cord, grasp plug to prevent plug damage or electrical shock.
- Fluid Metering, Inc. Drive Motors become HOT and can cause a burn. **DO NOT TOUCH!**

Figure 1

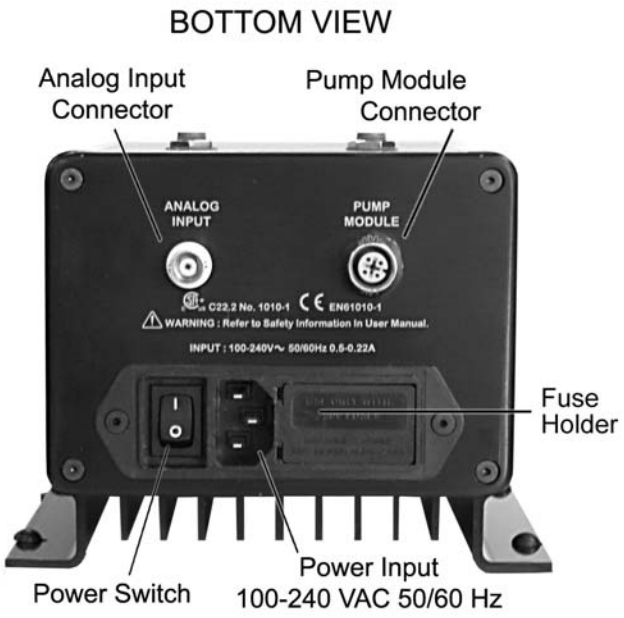


Figure 2

1.0 General Description

The V300 Stroke Rate Controller provides precision flow control for FMI variable speed "V" Series pumps. The V300 accomplishes this by varying the pump stroke rate from 5% to 100% of the drive's rated speed range of 90 to 1800 Strokes per Minute (SPM). The complete pump system consists of the V300 Controller and a variable speed "V" Series Pump. The V300 and pump are connected via a single cable (standard length is 4 meters while optional extension cables up to 20 meters are readily available).

The pump is comprised of a 90 volt DC pump drive module (PDM) with integrally mounted pump head module (PHM), and is available in two configurations, QV and RHV, to accommodate FMI's full range of pump head sizes.

1.1 Features (See Figures 1 & 2)

- Convenient front panel membrane switches for Run, Stop, Increase Flow & Decrease Flow.
- 3 1/2 Digit LCD displays percent of Flow/Speed.
- Selectable Manual or Analog flow rate control.
- Manual setting of flow rate with 0.1% adjustability
- Analog Input selectable 4-20 mA, 0-5 VDC, and 0-10 VDC input for communication with process instrumentation.
- Start, Stop, and Reverse Flow while maintaining flow settings.
- Current fold back eliminates stalled motor/ electronics damage.
- Universal Power accepts 100-240 VAC 50/60 Hz
- Quick connections for power, analog input, and pump modules.
- Rugged, Anodized Aluminum Enclosure designed for bench-top or wall mounting.

2.0 Specifications (See Fig. 3 Page 5)

2.1 Power In

Supply Voltage: 100-240VAC +/- 10%, 50/60 Hz.
Main Supply Current: 0.5 Amp
Fuses: T250V-1A (time lag), 5x20mm, 2 required

2.2 Physical

Dimensions: 7" H x 6 1/8" W x 4 3/4" D (180 x 158 x 120 mm) Weight: 3.8 lbs. (1.72kgs)

2.3 Environment

Humidity: 80% max for temperatures up to 31°C, decreasing linearly to 50% relative humidity at 40°C.
Pollution degree, 2
Operating temperatures range from 5ºC to 40ºC (41ºF to 104ºF)

3.0 Installation & Setup

3.1 Installation:

The V300 modules are designed to operate on a Table-top or as a Wall-mount (secured to a wall panel - see Figure 4 for template)

3.1.1 Table-top:

The system is configured for table top installation initially with rubber grommets slid into the mounting slots. Before moving on to configuring the control module, make sure that these rubber grommets are in place. There are no further installation steps for table top use.

3.1.2 Wall-Mounting:

For wall mounting, it is necessary to remove the four rubber grommets from the control module before attempting to mount. Each unit must be mounted in the correct orientation; with the labels facing right side up, the control module will have the cables at the bottom, the pump module will have the pump mounted to the bottom as well. Wall mounting may require an appropriate mounting board of at least 1/2"(12mm) thickness to straddle the studs of a typical plasterboard wall. See Figure 4

Caution: Do not mount V300 Controller or Pump Modules directly to plaster board.

3.2 Setup:

The configuration is set by selecting one of four interface modes accomplished with a 'set and forget' screwdriver slotted mode switch located on the front panel. The controller also incorporates a screwdriver slotted pump reversing switch on the front panel to facilitate special maintenance requirements. In all cases, the stroke rate is limited to a minimum of 5.0% and a maximum of 100.0% providing a stroke rate of 90 (5.0%) to 1800 (100.0%) strokes per minute.

The reversing switch is marked as "REV", "OFF", and "FWD". It must be set to "FWD" for normal operation. (See Figure 1)

Note: If the reversing switch is changed while the motor is running, the control module will shut down the pump and wait until the user presses "RUN". If the switch is left in the "OFF" position, the display will indicate a steady "OFF" condition.

The "RUN" button will start the pump drive module. The display will indicate the current stroke rate. The "STOP" button will immediately stop the pump and the display will alternate between "OFF" and the current stroke rate. The pump will remain "OFF" until the user presses "RUN".

Caution: Do not attempt to apply power to the control unit until it is configured to one of the following modes.

3.2.1 Manual Mode

Use this mode if you want to control the stroke rate manually. This mode allows you to select a stroke rate by pressing the up and down arrows located next to the

display. The stroke rate is displayed as a percentage of the fastest rate. If you attempt to go beyond these limits, the display will show three dashes indicating you have reached a limit.

To run the V300 system in manual mode, simply turn the Mode Switch to "MANUAL" using a screwdriver.
Note: In manual mode, the motor will not start until the user presses the "RUN" button. This allows the user to adjust the stroke rate prior to starting the pump. The last stroke rate to be selected before turning off the power will be the stroke rate stored for the next power up.

3.2.2 Analog Input Modes

General Note: While configured for a remote interface, the actual percentage of the Stroke Rate Maximum is displayed on the LCD for easy monitoring.

a) 0-5 Volt Mode: Use this mode to remotely control the stroke rate with a voltage source of 0 to 5 VDC. This voltage level interface utilizes the "ANALOG INPUT" connector on the control module to connect to the user's voltage source. (see figure 2)

Standard RG58 or other coaxial cable should be utilized for inducted noise immunity. The 0-5 volt interface requires approximately 2 mA of drive current at 5 volts thus making it compatible with most analog voltage interface modules. The stroke rate is displayed as a percentage of the fastest rate. The stroke rate is limited to a minimum of 5.0% and a maximum of 100.0%. If the control voltage is less then the minimum of 5.0% the display will alternate three dashes and the control value, indicating you are under the limit.

To run the V300 system in 0-5 V mode, simply turn the Mode Switch to "0-5 V" using a screwdriver (see Fig 1).

0-5 Volt input specifications:

Isolated input:	limited to ± 30 VDC from earth ground.
Input voltage range	0-5 VCD
Input current at 5 volts	2 mA
Maximum Rate (100.0%)	4.5 V
Minimum Rate (5.0%)	225 mVDC
Interface Linearity	1.5%
Accuracy	1%

Caution: If power is applied to the control unit while in 0-5 V mode, the motor will start automatically if the input voltage is 225 mV or above. The "STOP" and "RUN" buttons will stop and start the pump while in the 0-5 VDC mode however the up down arrows are not functional in this mode.

b) 0-10 Volt Mode:
Use this mode to remotely control the stroke rate with a voltage input source of 0 to 10 VDC. This voltage level interface utilizes the "ANALOG INPUT" connector on the control module to connect to the user's voltage source. Standard RG58 or other coaxial cable should be utilized for inducted noise immunity. (See Figure 2 for cable connections)

The 0-10 VDC interface requires approximately 1 mA of drive current at 10 VDC thus making it compatible with most analog voltage interface modules. The stroke rate is displayed as a percentage of the fastest rate. The stroke rate is limited to a minimum of 5.0% and a maximum of 100.0%. If the control voltage is less then the minimum of 5.0% the display will alternate three dashes and the control value, indicating you are under the limit.

To run the V300 system in 0-10 V Mode, simply turn the Mode Switch to "0-10 V" using a screwdriver. (See Figure 1)

0-10 Volt input specifications

Isolated input:	limited to ± 30 VDC from earth ground.
Input voltage range:	0-10 VDC
Input current at 10 volts:	1 mA
Maximum Rate (100.0%):	9.5 VDC
Minimum Rate (5.0%):	450 mVDC
Interface Linearity:	1.5%
Accuracy:	1%

Caution: If power is applied to the control unit while in 0-10 V Mode, the motor will start automatically if the input voltage is 450 mV or above. The "STOP" and "RUN" buttons will stop and start the pump while in the 0-10 Volt mode however the up down arrows are not functional in this mode.

c) 4-20 mA Mode: Use this mode to remotely control the stroke rate with a current source of 4 to 20 mA DC. This current level interface utilizes the "ANALOG INPUT" connector on the control module to connect to the user's current loop controller.

Standard RG58 or other coaxial cable should be utilized for inducted noise immunity. The 4-20 mA interface requires approximately 3.8 V of drive voltage to achieve 20 mA. thus making it compatible with most current control loop configurations.

The input is isolated to allow the control module to be inserted anywhere into a current loop that does not exceed ± 30 volts from earth ground. The stroke rate is displayed as a percentage of the fastest rate. The stroke rate is limited to a minimum of 5.0% and a maximum of 100.0%. If the control current results in less then the minimum of 5.0% the display will alternate three dashes and the control current percentage, indi-

cating you are under the limit. (See Figure 2 for cable connections)

To run the V300 system in 4-20 mA mode, simply turn the Mode Switch to "4-20 mA" using a screwdriver. (See Figure 1)

4-20 mA current input specifications:

Isolated input:	limited to ± 30 VDC from earth ground.
Input current range:	0-20 mA
Input voltage at 20 mA:	3.8 V
Max. Rate (100.0%):	20 mA
Min. Rate (5.0%):	4.8 mA
Interface Linearity:	1.5%
Accuracy:	1%

Caution: If power is applied to the control unit while in 4-20 mA mode, the motor will start automatically if the input current is 4.8 mA or above.The "STOP" and "RUN" buttons will stop and start the pump while in the 4-20 mA mode however the up down arrows are not functional in this mode.

3.3 Fluidic Set Up

There are a variety of Pump Head Module(PHM) configurations available for the V300 system.
Specific instructions are included with each configuration. It is important to follow the instructions included with the PHM to insure correct operation.

All fluid connections should be completed prior to moving on to the next steps. In most cases, the pump cannot be run "dry" for more than a few minutes without damaging.
FOR ADDITIONAL REFERENCES SEE H431 AND Q431

3.4 Connecting the Drive Module

Connect the drive module cable to the control unit's "PUMP Module" connector. The connector system is a screw in type that will tighten when turned clockwise. Tighten the connector hand tight. Do not over tighten, damage to the control unit and or cable may result, requiring factory service to repair.

3.5 Connecting to the Main Power (AC Power)

The V300 utilizes a standard "IEC" style power cord. The unit ships with a North American power cable and may require a country specific power cable for your locality. In any case, the V300 must be connected to an approved grounded outlet of suitable AC voltage designed for 100 to 240 VAC at 50 or 60 Hz. Your local distributor can supply you with the proper power cord for your needs. (See Figure 2 for cable connections)

4.0 Operation

CAUTION CHECK LIST

Make sure the Power Switch is turned off prior to connecting the approved power cable to the AC power outlet.

a) Do not attempt to apply power to the control unit until all of the above installation and set up procedures have been completed.

b) Double check reversing and mode switches prior to turning on the power switch.

c) Since the pump drive module can be a substantial distance from the control unit, it is imperative the operator visually verify that the pump drive module is ready for use and is not in the midst of some maintenance procedure.

d) If the pump drive cable is disconnected from the control unit, do not simply re-connect the cable. Most likely, the pump drive module is not currently usable due to some maintenance procedure. The operator must ask the appropriate personnel to connect the pump drive module.

4.1 In Manual Mode:

Turn on the AC power switch on the control module. After a brief initialization period (about 5 sec.) the display will indicate the current stroke rate setting then alternate the "OFF" display indicating the control is waiting for the operator to press "RUN". At this time the operator may adjust the stroke rate using the up and down arrows. When the appropriate stroke rate % is displayed, the operator presses "RUN" to start the pump. At anytime, the operator may press "STOP" to shut down the pump. After pressing "STOP" the pump will remain off until the operator press "RUN". The stroke rate may be adjusted while the pump is running in addition to when it is in the off mode. The minimum stroke rate is 5.0% and the maximum stroke rate is 100.0%. Attempting to exceed these limits will result in the three dashes being displayed. While in manual mode, the analog input signal is ignored completely.

4.2 All other Modes:

While the control module is set to one of the three analog interface modes, the control module is controlled by the reference signal being sent through the BNC cable. The display will indicate the percent of stroke rate being requested by the analog interface. For example; if the interface mode is 0-10 V, and the analog input is 1 V, the display will indicate approximately 10.0%.
These analog input modes are designed to operate without user intervention however the "STOP" and "RUN" buttons are active allowing the user to stop the pump drive and restart the pump after being stopped by the operator.

Caution: On power up, the pump will start automatically. Do not turn on the power to the control module unless you are sure that the pump is ready to operate.

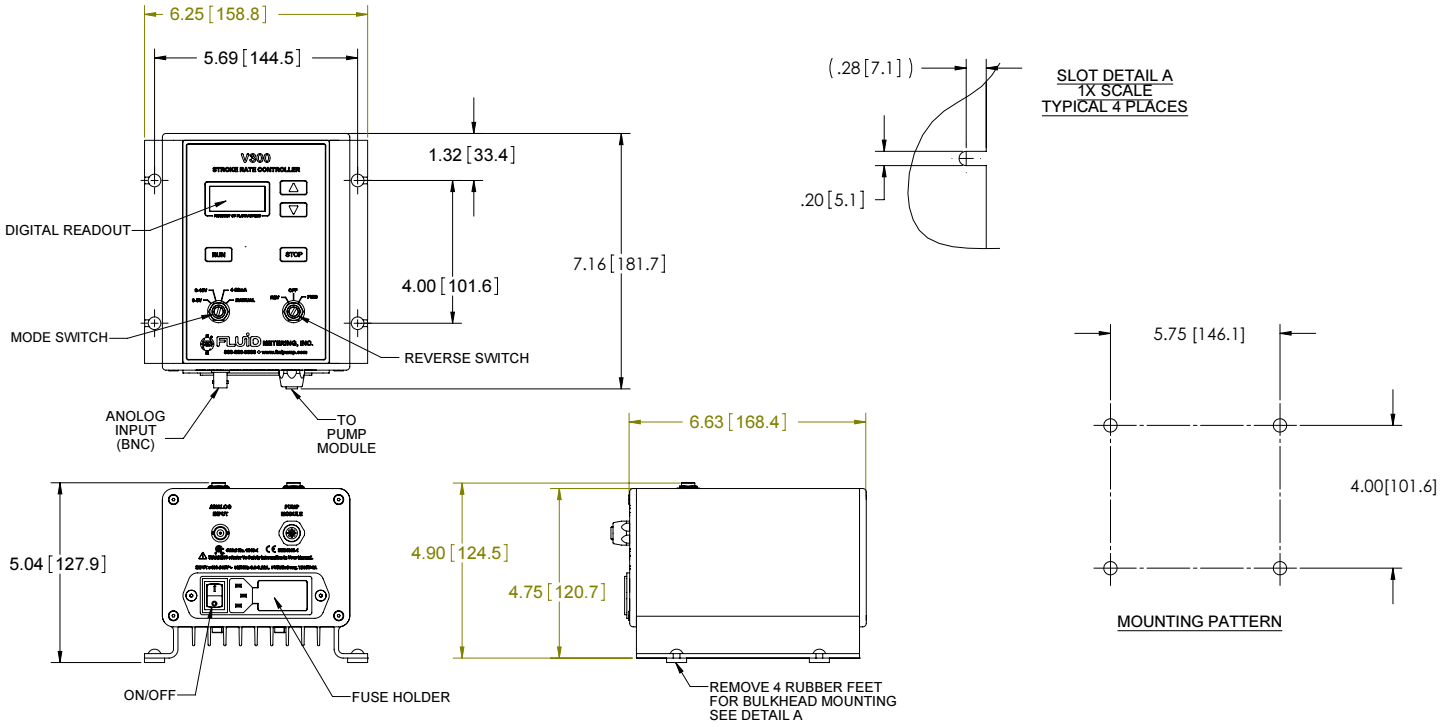
5.0 Current fold back:

The V300 incorporates a current fold back feature that prevents motor heating in case of a jammed pump. This current fold back feature makes it unlikely to blow a fuse under normal and stalled motor conditions.
This design provides maximum torque to handle temporary loads yet remains safe in a stalled condition for extended time frames. The fuses are intended to protect the mains from an internal failure of V300 power circuits. In the unlikely event a fuse blows, it should be replaced with the exact replacement type indicated in "Fuse Replacement" (See section 6.0).

6.0 Fuse Replacement:

The V300 utilizes a universal double fusing arrangement which allows the safe use in North America as well as European Communities.
The fuse holder will not open without removing the power cord. Once the power cord is removed, simply pry up the fuse cover at the indicated screwdriver slots, swing open the cover hinged towards the power socket. Then remove the fuse holder block by pulling it straight out exposing the fuses. Always replace both fuses with the same type and rating even if only one has blown. The V300 requires two (2) 5x20mm 1 A - 250 VAC Time Lag fuses. If the V300 blows these new fuses, then the unit must be taken out of service and returned to FMI for repair.

V300 PUMP DRIVE CONTROLLER SPECIFICATIONS



SPECIFICATIONS:
Input Power : Supply Voltage: 100-240VAC +/- 10%, 50/60 Hz.
Supply Current: 0.5 Amp

Fuses : T250V-1A (time lag), 5x20mm, 2 required

Environment : Humidity: 80% max for temperatures up to 31ºC (88ºF) decreasing linearly to 50% relative humidity at 40ºC (104ºF)
Pollution degree, 2
Operating temperatures : 5ºC to 40ºC (41ºF to 104ºF)

Unit Weight : 3.8 LBS (1.72 kg)

NOTE: DIMENSIONS ARE IN INCHES [MILLIMETERS]
TOLERANCES UNLESS OTHERWISE SPECIFIED:
.XX = ±.02 [.51]
.XXX = ±.005 [.127]

FMI P/N V300

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5 Aerial Way, Suite 500 Syosset, N.Y. 11791

TITLE	V300 CONTROLLER SPECIFICATIONS		
DWG NO	600140	REV B	SHT 1 OF 1

Figure 3

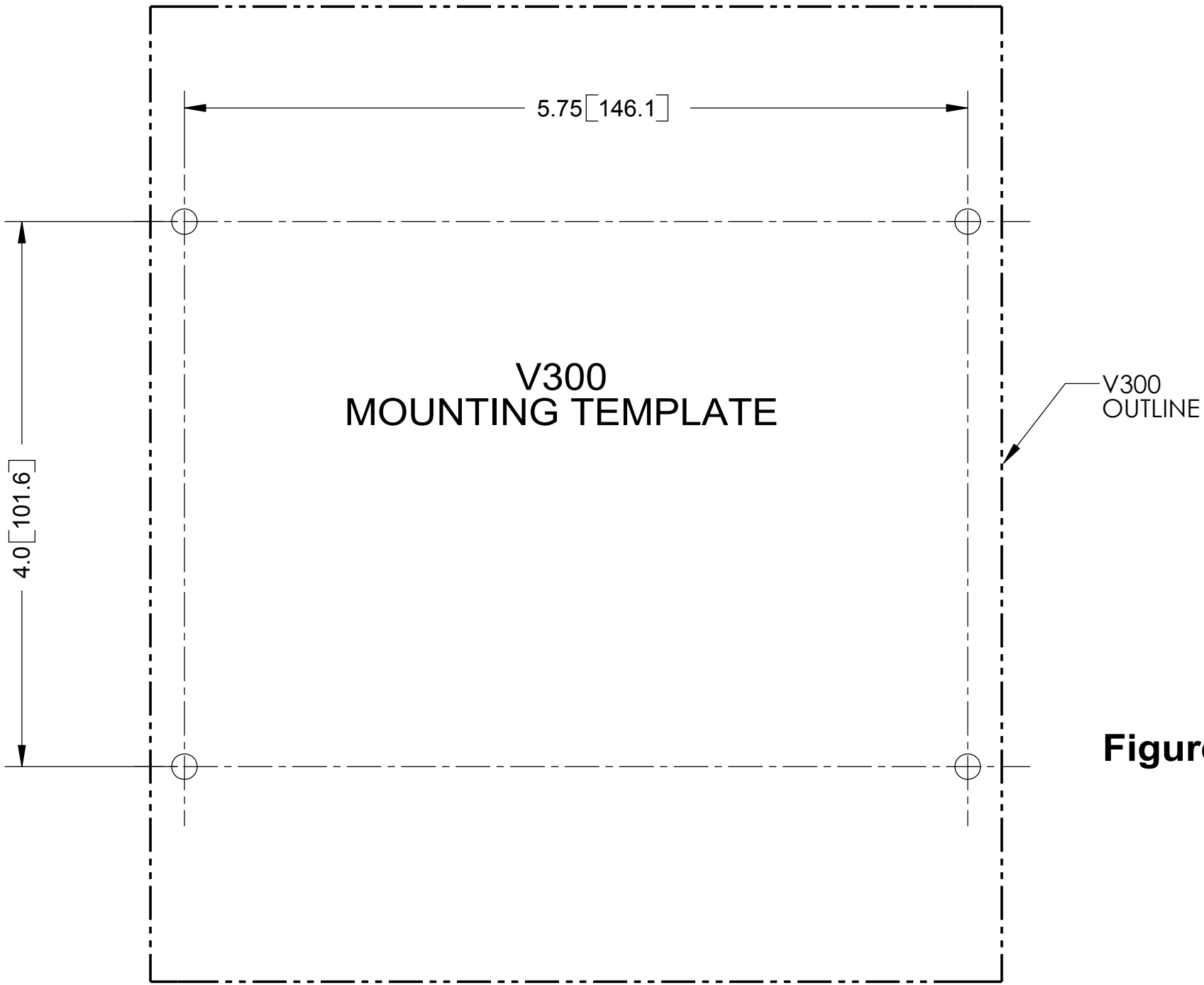

Figure 4